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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,060	06/25/2001	Kwon Hong	P66792US0	6978

136 7590 09/02/2003

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EXAMINER

ANYA, IGWE U

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 09/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/888,060

Applicant(s)

HONG ET AL.

Examiner

Igwe U. Anya

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 16 is objected to because of the following informalities: in line 2 delete "staked" replace with --stacked--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 to 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horri (US Patent 6255187) in view of Applicant's Admitted Prior Art (AAPA).

5. Horri teaches a DRAM (col1 lines 14 - 44) comprising a capacitor (fig. 1H, 2) having an ILD (20), an inter connect plug including a diffusion barrier layer of TiN (34), and a ruthenium seed layer (40, & col. 6 lines 8 - 25) formed in the ILD. A polysilicon

contact (12) between the diffusion layer and the substrate (10). An ohmic contact (32) between the diffusion barrier (34) and the substrate (10). The polysilicon layer (12) is also between the ohmic contact layer (32) and the substrate (10). An electroplated lower capacitor electrode (70, 72, 74) contacting the seed layer (col. 6 line 61 – col. 7 line 31). A BST dielectric (80) deposited on the lower electrode, and an upper electrode formed on the BST dielectric (col. 6 line 66 – col. 7 line 13). The electroplating is done using a current density of $1 \text{ A/sq dm} = 10 \text{ mA/sq cm}$ (col. 7 lines 12 – 19).

6. Horii lacks a gate electrode and source/drain junctions formed in the substrate, and the electroplating current being a DC or pulsed DC.

7. However, figs. 2 of AAPA teaches a gate electrode (13) and source/drain junctions (14) formed in the substrate (10). AAPA further teaches forming a glue layer (22) on a seed layer (21), forming a sacrificial layer (23) on the glue layer, forming an opening defining a region for the lower electrode (fig. 2C), removing the sacrificial layer and the glue layer (fig. 2D), and depositing and depositing the lower electrode by electroplating technique (page 3 line 20 – page 4 line 2).

8. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate AAPA teachings into the Horri reference to fabricate a DRAM capacitor. The method of forming a device is not germane to the issue of patentability of the device itself. In the instant case forming the capacitor electrode by electroplating and the electroplating limitations thereof. Therefore, this limitation has not been given patentable weight.

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9. Claims 7 – 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horri (US Patent 6255187) in view of Applicant's Admitted Prior Art (AAPA), and further in view of Simpson et al. (US Patent 6297155).
10. The Horii/AAPA reference teaches the features previously outlined, but lacks the electroplating current being DC or pulsed DC.
11. However, Simpson et al. teach a method of electroplating a conductor (118 A) on as a seed layer (116) utilizing DC or pulsed DC (col. 9 lines 35 - 67).
12. Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to combine the teachings of Simpson et al. and the Horii/AAPA reference to fabricate an electrode plate with less voiding.
13. Claim 17 is objected to as being dependent upon a rejected claim, but would be allowable if rewritten in independent form.

Remarks

14. The argument forwarded by the applicant pertains to the current density in electroplating the lower electrode. However, Horii teaches such electroplating process with current density of specified range. Simpson et al. show that the current can be DC or pulsed DC. Therefore, applicant's argument is not persuasive. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

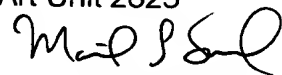
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Igwe U. Anya whose telephone number is (703) 308-3549. The examiner can normally be reached on M - F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (703) 308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

IA
August 25, 2003

Igwe U. Anya
Examiner
Art Unit 2825



MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800